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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------------------|
| 09/912,279 | 07/24/2001 | Paul Kettley | GB920000032US2 | 5192 |
| 7590 | 12/18/2003 | | | EXAMINER EHICHOYA, FRED I |
| Edward H. Duffield IBM Corporation T81/503 PO Box 12195 Research Triangle Park, NC 27709 | | | ART UNIT 2172 | PAPER NUMBER 4 |
| DATE MAILED: 12/18/2003 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

P26

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|------------------------------|-------------------|----------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/912,279 | KETTLEY ET AL. |
| | Examiner | Art Unit |
| | Fred I. Ehichioya | 2172 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1 - 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1 - 20 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 24 July 2001 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) Interview Summary (PTO-413) Paper No(s). _____
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____

DETAILED ACTION

1. Claims 1 – 20 are pending in this office action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1 - 7, and 14 - 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S Patent 6,434,605 issued to Paul Faulkner et al (hereinafter "Faulkner") in view of U.S. Patent 6,092,086 issued to James L. Martin et al (hereinafter "Martin").

Regarding claim 1, Faulkner teaches a method for recovering from failures affecting a resource manager within a group of resource managers, wherein the resource managers within the group have access to a shared resource via which remote resource managers communicate with the resource managers within the group, the shared resource including data storage structures to which resource managers within said group connect to send and receive communications, the method comprising:

storing, within a first data storage structure of the shared resource, unit of work descriptors for operations performed in relation to said shared resource by the resource managers in said group (see column 1, lines 33 – 51);

sending a notification of a connection failure between a second data storage structure of the shared resource and a first resource manager within said group, the notification being sent to the remaining resource managers within the group which are connected to the second data storage structure (see column 3, lines 19 – 25);

one or more of said remaining resource managers accessing said first data storage structure and analysing the unit of work descriptors to identify the units of work relating to the second data storage structure that were being performed by the first resource manager when the connection failure occurred (see column 3, lines 25 – 32).

Faulkner does not explicitly teach said one or more remaining resource managers recovering the identified units of work.

Martin teaches said one or more remaining resource managers recovering the identified units of work (see column 5, lines 31 – 42 and column 26, lines 16 - 19).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine teaching of Martin with the teaching of Faulkner wherein resource manager in conjunction with a process controller perform the necessary tasks. The motivation is that the resource manager is capable of concurrent processing of retrieving and a two-phase commit in a distributed transaction processing.

Regarding claim 2, Faulkner teaches if there are no remaining resource managers connected to the second data storage structure after said connection failure, said notification is sent to a remaining resource manager when that resource manager connects to the second data storage structure (see column 3, lines 19 – 25).

Regarding claim 3, Martin teaches if there are no remaining resource managers connected to the second data storage structure after said connection failure, the failed resource manager determines when it is restarted whether any other resource manager has performed recovery for its units of work relating to the second data storage structure and, upon determining that no resource manager has performed said recovery, the restarted resource manager recovers said units of work (see column 20, lines 63 – 67 and column 21, lines 1 – 12).

Regarding claim 4, Martin teaches wherein all remaining resource managers within the group which are connected to the second data storage structure respond to said notification by attempting to access said first data storage structure to identify units of work to recover, and the method includes the further steps of:

responsive to a first remaining resource manager identifying a unit of work to recover, said first remaining resource manager attempting to set a flag for said unit of work (see column 32, lines 13 – 27);

responsive to successfully setting said flag, assigning recovery responsibility for said unit of work to said first remaining resource manager (see column 31, lines 38 – 47); and

refusing to assign recovery responsibility for said unit of work to said first remaining resource manager if said flag has been set by another remaining resource manager (see column 31, lines 48 – 57).

Regarding claim 5, Martin teaches responsive to said flag having been set by another remaining resource manager, said first remaining resource manager attempting to identify a further unit of work to recover and attempting to set a flag for said identified further unit of work (see column 32, lines 19 – 27).

Regarding claim 6, Faulkner teaches including the following steps in response to a connection failure between the second data storage structure of the shared resource and said first remaining resource manager during recovery of said unit of work:

sending a notification of said connection failure to the remaining resource managers within the group which are connected to the second data storage structure (see column 3, lines 48 – 53);

one or more of said remaining resource managers accessing said first data storage structure and analysing the unit of work descriptors to identify the units of work relating to the second data storage structure that were being performed by the first remaining resource manager when the connection failure occurred (see column 3, lines 25 – 32).

Faulkner does not explicitly teach said one or more remaining resource managers recovering the identified units of work

Martin teaches said one or more remaining resource managers recovering the identified units of work (see column 5, lines 31 – 42 and column 26, lines 16 - 19).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine teaching of Martin with the teaching of Faulkner wherein resource manager in conjunction with a process controller perform the necessary tasks. The motivation is that the resource manager is capable of concurrent processing of retrieving and a two-phase commit in a distributed transaction processing.

Regarding claims 7 and 17, Martin teaches wherein the unit of work descriptors include:

- a unit of work identifier (see column 42, lines 50 – 53);
- an identification of messages put or retrieved within the unit of work (see column 36, lines 40 – 42);
- a status for the unit of work (see column 32, lines 40 – 45); and
- a sequence number (see column 36, lines 50 – 67).

Regarding claim 14, Martin teaches wherein a single unit of work represented by a unit of work descriptor may include operations performed in relation to a plurality of data storage structures, and wherein the partial units of work corresponding to said operations are recovered by different ones of said remaining resource managers within the group (see column 31, lines 38 – 54).

Regarding claim 15, Faulkner teaches a method for recovering from failures affecting a resource manager within a group of resource managers, wherein the resource managers within the group have access to a shared resource, the shared resource including data storage structures to which resource managers within said group connect to perform operations in relation to data held in said shared resource, the method comprising:

storing, within a first data storage structure of the shared resource, unit of work descriptors for operations performed by the resource managers in said group in relation to data held in said shared resource (see column 1, lines 31 – 58);

sending a notification of a connection failure between a second data storage structure of the shared resource and a first resource manager within said group, the notification being sent to the remaining resource managers within the group which are connected to the second data storage structure (see column 3, lines 19 – 25);

one or more of said remaining resource managers accessing said first data storage structure and analysing the unit of work descriptors to identify the units of work relating

to the second data storage structure that were being performed by the first resource manager when the connection failure occurred (see column 3, lines 25 – 32).

Faulkner does not explicitly teach said one or more remaining resource managers recovering the identified units of work

Martin teaches said one or more remaining resource managers recovering the identified units of work (see column 5, lines 31 – 42 and column 26, lines 16 - 19).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine teaching of Martin with the teaching of Faulkner wherein resource manager in conjunction with a process controller perform the necessary tasks. The motivation is that the resource manager is capable of concurrent processing of retrieving and a two-phase commit in a distributed transaction processing.

Regarding claim 16, Faulkner teaches wherein the data storage structures of said shared resource include data storage structures which contain shared message queues and said operations performed in relation to said shared resource include putting messages onto a shared message queue and retrieving messages from a shared message queue, for communication between a remote resource manager and resource managers within said group (see column 1, lines 41 – 51).

Regarding claim 18, Martin teaches wherein the operations of putting messages onto a shared queue and retrieving messages from a shared queue are performed under transactional scope such that a message which is put is only available to

resource managers other than the resource manager putting the message after commitment of the put operation and a message which is retrieved is only available to the retrieving resource manager after commitment of the retrieval operation, and wherein said stored unit of work descriptors identify each of the following:

units of work that were uncommitted but for which a decision to commit had been made when the failure occurred (see column 5, lines 31 – 42);

units of work that were uncommitted but for which a decision to abort had been made when the failure occurred (see column 5, lines 43 – 51); and

units of work for which no commit or abort decision had been made when the failure occurred (see column 5, lines 51 – 61); and

wherein recovering the identified units of work comprises (see column 32, lines 14 – 18):

committing message put and retrieval operations for which a decision to commit had been made (see column 32, lines 40 – 55);

backing out message put and retrieval operations for which a decision to back out had been made (see column 35, lines 10 – 18); and

backing out message put and message retrieval operations for which no commit or abort decision had been made (see column 37, lines 48 – 53).

Regarding claims 19 and 20, Faulkner teaches a distributed data processing system and a computer program product comprising program code recorded on a machine-

readable recording medium, the program code comprising the following set of components:

a shared access resource including data storage structures to which the resource managers connect to send and receive communications to and from remote resource managers, the shared access resource including (see Martin column 27, lines 22 – 40):

means for storing, within a first data storage structure of the shared resource, unit of work descriptors for operations performed in relation to said shared resource by the resource managers in said plurality (see column 1, lines 40 – 50); and

means for sending a notification of a connection failure between a second data storage structure of the shared resource and a first resource manager within said plurality, the notification being sent to the remaining resource managers within the plurality which are connected to the second data storage structure (see column 3, lines 19 – 25);

wherein said remaining resource managers include:

means for accessing said first data storage structure and analysing the unit of work descriptors to identify the units of work relating to the second data storage structure that were being performed by the first resource manager when the connection failure occurred (see column 3, lines 25 – 32).

Faulkner does not explicitly teach a plurality of resource managers; means for storing, within a first data storage structure of the shared resource, unit of work descriptors for operations performed in relation to said shared resource by the resource managers in said plurality; and means for recovering the identified units of work.

Martin teaches a plurality of resource managers (see column 26, lines 16 – 24); means for storing, within a first data storage structure of the shared resource, unit of work descriptors for operations performed in relation to said shared resource by the resource managers in said plurality (see column 1, lines 40 – 50); and means for recovering the identified units of work (see column 32, lines 14 – 18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine teaching of Martin with the teaching of Faulkner wherein resource manager in conjunction with a process controller perform the necessary tasks. The motivation is that the resource manager is capable of concurrent processing of retrieving and a two-phase commit in a distributed transaction processing.

4. Claims 8 - 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faulkner in view of Martin and further in view of U.S. Patent 6,353,834 issued to David W.H. Wong et al (hereinafter "Wong").

Regarding claim 8, Faulkner and Martin disclose the claimed subject matter as discussed in claim 1. Faulkner or Martin does not explicitly teach list header.

However, Wong teaches wherein the shared resource is a coupling facility list structure, the second data storage structure is a coupling facility list structure in which a coupling facility list header represents a shared access message queue, and the first data storage structure is an administration list structure of the coupling facility for storing unit of work descriptors (see column 7, lines 14 – 24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine teaching of Wong with the teaching of Faulkner and Martin wherein the header record the messages stored in the queue. The motivation is that the header makes the retrieval of messages easy since the location and order of arrival of messages are listed in the header.

Regarding claim 9, Wong teaches storing within the coupling facility, for each resource manager within the group, a list header information map representing the set of shared access message queues within the second data storage structure for which the resource manager has performed some work (see column 3, lines 66 – 67 and column 4, lines 1 – 9).

Regarding claim 10, Wong teaches reading said list header information map during recovery to identify the set of shared access message queues within the second data storage structure for which the failed resource manager has performed some work (see column 4, lines 65 – 67 and column 5, lines 1 – 7).

Regarding claim 11, Wong teaches storing within the shared resource a structure interest map identifying the set of data storage structures to which respective resource managers within said group are connected (see column 4, lines 10 – 39).

Regarding claim 12, Faulkner teaches the step of recovering the identified units of work is a first recovery phase and wherein the method includes a second recovery phase comprising the steps of:

identifying any operations performed by the failed resource manager on said set of data storage structures which were not recovered in the first recovery phase (see column 6, lines 37 – 67 and column 7, lines 1 – 17); and
one or more of said remaining resource managers then backing out said unrecovered operations (see column 6, lines 47 – 52).

Faulkner or martin does not explicitly teach resource manager.

Wong teaches reading the structure interest map for the failed resource manager to identify the set of data storage structures to which the failed resource manager was connected at the time of said connection failure (see column 3, lines 51 – 58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine teaching of Wong with the teaching of Faulkner and Martin wherein resource manager implements the backing out of uncommitted data during system failure. The motivation is that the resource manager is capable of concurrent processing of recovery and a two-phase commit in a distributed transaction processing.

Regarding claim 13, Faulkner teaches setting a key for operations performed in relation to the shared resource, the key identifying the resource manager which performed the operation, and wherein the identification of operations performed by the failed resource manager comprises checking said keys for unrecovered operations

performed in relation to any of said set of data storage structures (see column 5, lines 16 – 24).

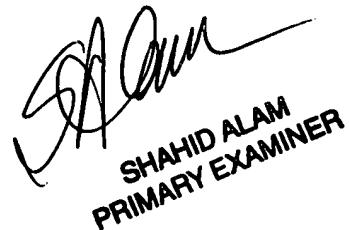
Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred I. Ehichioya whose telephone number is 703-305-8039. The examiner can normally be reached on M - F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Y. Vu can be reached on 703-305-4393. The fax phone number for the organization where this application or proceeding is assigned is 703-746-7239.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-303-3900.

Fred I. Ehichioya
Examiner
Art Unit 2172
December 14, 2003



SHAHID ALAM
PRIMARY EXAMINER